REMARKS

Before discussing the rejections set forth by the Examiner in the outstanding Office Action, Applicant feels that it would be appropriate to describe in a summary form the manner in which the present invention differs from the prior art. The invention is deceptively simple, but the simplicity belies the true advantages, unexpected benefits and unobviousness of the invention.

Radiation–curable resins have been used in certain ways in the prior art to bond surfaces to each other. Applicant has acknowledged this in the specification, the claims as filed and more specifically by the present amendment in which the claims are cast in Jepson form. What the art has not done, and what the present invention does, is to use only a specific physical form of the radiation-curable resin as the adhesive layer.

That is, the radiation-curable resins used to form the adhesive layer must be solid[1] and previously unirradiated and must be present on the multi-layered structure in solid form (as opposed to a tacky form) before application to the substrate and prior to radiation cure. Stated another way, liquid radiation-curable resins are not appropriate to form the adhesive layer in the invention. This is not to say that the solid radiation-curable resins may not be applied in liquid form, i.e., dissolved in a solvent, however. They quite properly and conveniently may be so applied and the solvent evaporated off to yield a solid layer of the original solid resin.

[1] The terms "solid" and "liquid" used herein to characterize the radiation-curable resin are meant to apply to the condition at room temperature

The art referred to in the present record, however, utilizes both liquid radiation-curable resins and previously, at least partially irradiated, resins prior to final radiation cure.

The reasons that the art technique does not work in the present invention, can be seen from the following:

The process of the present invention starts with a multi-layered structure, a hot stamping foil for example, on which there is a layer of a solid, non-tacky, previously unirradiated, radiation-curable resin which upon curing by radiation will form the basis of a tenacious, durable connective link to information transferred to a substrate. The essence of the invention is to make certain that the adhesive layer comprising the radiation-curable resin is solid and non-tacky. The reason that the product must be non-tacky is that the manufacturing process used to produce the multi-layer structure yields a roll of product. The product is thus made, stored, shipped, supplied and used in roll form. If the adhesive layer were tacky, the multi-layered structure could not be rolled upon itself because the tacky layer of radiation-curable resin would transfer spontaneously to the top layer (carrier layer) of the multi-layer structure in each circumference of the roll and adhere to that top layer. This would destroy the integrity of the hot stamping foil starting material and frustrate attempts to apply the foil to a substrate.

The novelty of these aspects of the invention is pointed out in the currently amended Claim 1, presented in the Jepson format. No new matter is presented by Amendment, the language being supported by the disclosure in the Specification as filed.

To illustrate this, the Examiner's attention is directed to Figure 2 of the Specification in which the starting material of the process of the invention is represented in a flat aspect. Layer 20 is the layer that constitutes the adhesive layer of the solid, previously unirradiated radiation-curable resin which will serve to bond the information from layers 18 and 19 to the subsequently contacted substrate 26 (see Figure 8) once radiation cured. Figure 1 (at 4 and 6) shows a roll 4 of the hot stamping foil 6 of Figure 2 being applied to a substrate 3 of currency paper (See Specification page 22, lines 4-21). Layer 20 in roll form, contacts the top surface of layer 16, i.e., the carrier layer. Once contacted, if adhesive layer 20 (Fig. 2) were sufficiently tacky, the risk of causing a transfer of the tacky adhesive to the top of layer 16 would be great. For this reason, a rolled transfer element, such as a hot stamping foil, cannot tolerate tacky adhesives as the subsequent adhesive layer.

The relevance of this disclosure is that the primary prior art reference relied on by the Examiner does not use non-tacky radiation-curable resin layers. In fact, the art relied on by the Examiner as the primary reference against all the claims in the application, namely Iijima, expressly requires the use of liquid radiation-curable resins to produce his adhesive layer. Iijima uses the liquid deliberately to produce a tacky surface.

Iijima has been applied as the primary reference in combination with other references in rejection of all of the claims under 35 U.S.C. 103.

Iijima, however does not teach the invention and does not suggest it. In fact, Iijima leads away from the inventive element in that it teaches the use of liquid radiation-curable resins and the formation, of a tacky adhesive induced by the liquid radiation-

curable resin. A close reading of Iijima shows that he does not even include solid radiation-curable resins in the adhesive layer, as will be seen below.

While at first blush, a cursory review of Iijima's drawings and the general explanations of his process would seem to cloak Iijima with relevance to the present invention, a detailed review of his actual teachings reveals that his adhesive component is not a solid radiation-curable adhesive at all, but rather a tacky adhesive, induced by the use of a liquid radiation-curable resin in combination with a solid polymer (not even a solid radiation-curable resin).

Unfortunately, for readers skilled in the art, Iijima uses the word "resin" to describe a different layer from that of Applicant. For example, the word "resin" is used by Iijima to mean his support layer while Applicant has used the word "resin" primarily in the description of the "solid radiation-curable resin" as the adhesive layer. Applicant's resin applies to the adhesive layer whereas Iijima's resin has nothing to do with the adhesive layer. Thus, whatever Iijima teaches with respect to his "resin" has no relationship to the solid radiation-curable resin used by Applicant in his process.

Evidence of this appears in the manner in which Iijima describes his adhesive layer. In most places throughout the patent, Iijima describes his adhesive layer in generic terms, which are silent as to whether the layer is a solid or a liquid. However, in presenting the specifics about his actual work, one sees that it was decidedly a liquid resin, which Iijima used to prepare his avowedly "tacky" adhesive.

In discussing specific aspects and properties of his adhesive layer, he describes selecting acrylic, epoxy, isocyanate or silicone types of materials as his starting materials, but does not indicate in these general statements whether they are solid or liquid.

Importantly, however, since Iijima wants to form a tacky layer prior to cure, he must use materials that ensure the formation of a tacky adhesive. He clears up his faulty generic descriptions in Column 19, line 6 et seq., where he describes the specifics of the components of the adhesives being used as follows: (all emphasis added).

> "As the adhesive used for the adhesive layers (5) and (15) of the functional film in the present invention, adhesives capable of providing an adhesive layer having a tacky feeling by just applying an adhesive solution and drying, and providing a very hard cured layer by sticking the adhesive layer onto the transfer-object article followed by curing the adhesive layer by ultraviolet rays, are preferable...
>
> "Thus, the present inventor also studied regarding adhesives satisfying such properties, and found out that following adhesive compositions are suitable as the adhesive used for the adhesive layer of the functional film in the present invention.
>
> 1. An adhesive composition comprising a polymer resin component (P) having a glass transition temperature Tg of 30° C. or higher and a curable low molecular weight component (M) in a weight ratio P/M of 8/2 to 2/8.
>
> 2. The adhesive composition according to 1., wherein the polymer resin component (P) is a solid at an ordinary temperature and the curable low molecular weight component (M) is a liquid at an ordinary temperature."
>
> "By that the polymer resin component is a solid at an ordinary temperature and that the curable low molecular weight component is a liquid at an ordinary temperature, a self-adhesive layer having self-adhesive properties and being curable by providing stimulation can be easily formed. The self-adhesive layer may have suitable self-adhesive properties."

This demonstrates that Iijima is using a liquid curable resin in combination with a solid polymer (apparently not even a radiation-curable one) as his adhesive layer blend so that he can get the tacky property of his adhesive composition and therefore "satisfy such properties". This is totally contrary to the non-tacky solid composition needed by Applicant before the radiation curing step.

That Iijima decidedly wants a tacky substance is set forth throughout his Specification and is illustrated in column 20, lines 31-38.

> "Therefore the adhesives capable of providing an adhesive layer having a tacky feeling by applying an adhesive solution and drying and [then] providing a very hard cured layer were developed."

By the present amendment, Claim 1, the lone independent claim has been rewritten in Jepson form to highlight the novel patentability improvement in the art-known process for preparing tenacious, durable bonds of surfaces to each other via radiation-curable resins. The claims require that only solid radiation-curable resins be used in the adhesive layer, that such resins not be previously cured by radiation prior to the final radiation cure, and that the adhesive layer be non-tacky, i.e. sufficiently solid so that the multi-structure may be rolled upon itself without the adhesive layer adhering to the top of the carrier layer. These elements clearly distinguish over the cited art, are not obvious therefrom, and Applicant submits, are patentable thereover.

All of the claims in the Application have been rejected as unpatentable under 35 U.S.C. § 103 over Iijima as the primary reference used in various combinations with other references depending on the claim.

Since Iijima is the primary reference against all claims, Applicant has chosen to deal at length with Iijima to show that Iijima fails to disclose or suggest the basic elements of Applicant's invention namely, the use of only solid radiation-curable resins to produce a solid, non-tacky adhesive. Obviously, if the rejection based on Iijima does not apply, then all combinations with Iijima will fail as well. In fact, none of the secondary references supply these elements to the Iijima reference. The Examiner relies on them to

show other well-known variables in the applied art but all of them fail to recite the critical elements of Applicant's invention cited above. For this reason, Applicant hereby traverses all the rejections set forth by the Examiner which utilize the secondary references in any combination with Iijima as the primary reference.

The Examiner has applied all the secondary references assuming Iijima teaches the basic concept of Applicant's invention, (which Iijima does not do). By the above analysis, we have shown that Iijima merely laminates two structures with a liquid UV curable adhesive using UV radiation and heat and pressure.

Kay merely affirms that UV radiation and heat and pressure provide a bonding of surfaces.

Schmitz et al disclose various known aspects of forming a multi-layer structure, but do not suggest using only a solid radiation curable resin to obtain a non-tacky layer.

Using a vinyl group for transfer of information is well-known and conventional as shown for example by Nakajima et al. It is only solid radiation-curable resin compositions, vinyl among them, that are the basis of the present invention.

Saksa is relied on as showing that printing graphic and text on the adhesive as a receptor media is allegedly well-known and conventional. Janke et al is relied on disclosing an epoxy resin system, thermoplastic, epoxy containing thermoplastic oligomer, i.e. heat sensitive resin adhesive, rubber and elastomer which do not include any radiation curable functional groups, but again, that is not the basis of Applicant's invention.

Stoner, Kopf and Kay are relied on as showing caprolactone modified phenoxy resins in non-related art.

None of these secondary references teach or suggest Applicant's use of only solid radiation-curable resins, previously unirradiated, to yield a non-tacky pre-cured solid layer. Thus their combination with the primary Iijima reference, which also fails to teach or suggest these elements, cannot and does not yield the instant invention.

Reliance on these is therefore misplaced and should be withdrawn.

The claims as now amended are patentable over the prior art and meet all of the rejections under 35 U.S.C. 112. More specifically, the following paragraphs of the Office Action are obviated by the actions taken:

Para. 3. Jepson format clearly points out the subject matter of the invention

Para 4. The radiation curable resin bonds the information to the substrate as shown in the amended claims.

Para 5. The art both peels and does not peel away the carrier

Para 6-11. Proper antecedent basis has been chosen i.e., "radiation curable resin"

Para 11. The trademark designation has been removed.

A favorable action is courteously solicited.

Respectfully submitted,

Ralph T. Lilore
Attorney at Law
Registration No. 20,079
371 Franklin Avenue
Nutley, New Jersey 07110
Telephone: 973-667-6000
Facsimile: 973-667-1200
E-mail: Rlilore@AOL.com